National Institute of Environmental Health Sciences

Calculating workplace WBGT from meteorological data: A tool for climate change assessment

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Abstract:

The WBGT heat stress index has been well tested under a variety of climatic conditions and quantitative links have been established between WBGT and the work-rest cycles needed to prevent heat stress effects at the workplace. While there are more specific methods based on individual physiological measurements to determine heat strain in an individual worker, the WBGT index is used in international and national standards to specify workplace heat stress risks. In order to assess time trends of occupational heat exposure at population level, weather station records or climate modelling are the most widely available data sources. The prescribed method to measure WBGT requires special equipment which is not used at weather stations. We compared published methods to calculate outdoor and indoor WBGT from standard climate data, such as air temperature, dew point temperature, wind speed and solar radiation. Specific criteria for recommending a method were developed and original measurements were used to evaluate the different methods. We recommend the method of Liljegren et al. (2008) for calculating outdoor WBGT and the method by Bernard et al. (1999) for indoor WBGT when estimating climate change impacts on occupational heat stress at a population level.

Source: https://www.jstage.jst.go.jp/article/indhealth/50/4/50_MS1352/_article

Resource Description

Exposure : ☒

weather or climate related pathway by which climate change affects health

Meteorological Factors, Solar Radiation, Temperature, Other Exposure

Temperature: Fluctuations

Other Exposure: dew point

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

Other Health Impact: heat stress

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified